AMENDMENTS TO THE CLAIMS

1-9. (canceled)

10. (currently amended) A system for analyzing a sample for the presence of specific targets in a biochip while eliminating major background emissions, which system comprises:

a biochip that includes

a flat optical mirror surface which reflects incident excitation and/or emission photons,

one or more transparent dielectric layers coating said mirror surface, and

a plurality of three-dimensional domains attached to an exposed surface of said dielectric layer yielding detectable photon energy corresponding to the presence of analyte ~~within~~ distributed throughout the domain as a result of spontaneous emission, scattering or other mechanism, each domain being of a thickness equal to or greater than about one-half of an optical emission wavelength of said photon energy, and

an optical detection system that is adapted to quantify the presence of analyte in each domain by measuring or imaging photons associated with each analyte domain,

said dielectric layer or layers having a thickness which is approximately N/2 wavelengths, where N is any integer greater than 0 and a refractive index such that, for a set or range of reference wavelengths, net destructive interference occurs for at least one of the following conditions at the exposed surface of the dielectric:

i. for incident excitation light energy ~~destructive, interference~~ ,destructive interference occurs between radiation propagating toward the mirror through the dielectric and reflected excitation radiation propagating away from the mirror, and

ii. for light energy emitted via spontaneous emission, scattering or other process occurring at about the exposed dielectric layer surface, destructive interference occurs between wavefronts emitted or scattered toward the direction away from the mirror and wavefronts emitted or scattered toward the mirror and reflected by the mirror,

whereby, for any sources of potential background photon contamination at the plane of said exposed surface, net destructive interference occurs at the set or range of reference wavelengths thereby diminishing any such contaminant optical signal.

11. (currently amended) The system of claim 10 ~~where~~ wherein said optical detection system includes a source of excitation or illumination which is ~~used to induce~~ capable of inducing optical emission from such analyte.

12. (canceled)

13. (currently amended) The system of claim ~~12 where~~ 10 wherein said detection system includes means for imaging an identifiable pattern of source brightness distribution which can be ~~imaged as determined by~~ used to estimate:

i. the three-dimensional morphology of the domains containing analyte, and

ii. the distribution of analyte within the three-dimensional structure of the domain.

14. (currently amended) The system of claim 13 wherein said means for imaging includes means for ~~the quantity of domain analyte can approximated by a process that includes~~ integrating the brightness over the entire image of the domain to approximate the quantity of domain analyte.

15. (currently amended) The system of claim 13 wherein ~~an estimation of~~ said means for imaging includes means for estimating analyte quantity ~~can be obtained~~ from the brightness pattern by ~~a process that includes~~ integrating the brightness over the entire image of the domain, with greater weighting given to those regions with greater mean brightness.

16. (withdrawn) A method of analysis using the system of claim 10 wherein a brightness pattern is first identified and such pattern is then used to estimate one or more of the following parameters:

i. morphological symmetry and regularity of the domain, including circular symmetry,

ii. conformance of the brightness pattern to an expected set of patterns, and

iii. physical dimensions of the domain based upon counting the number of bright or dark contours and using knowledge of the wavelengths within the dielectric and analyte domain.

17. (withdrawn) The method of claim 16 wherein such conformance is measured relative to a scenario where analyte is uniformly distributed within the domain.

18. (withdrawn) The method of claim 16 wherein such conformance is measured relative to a scenario where analyte is concentrated on the surface of the domain.

19. (new) The system of claim 10 where said mirror surface is a metallic film deposited upon a flat substrate.

20. (new) The system of claim 19 where the mirror surface is made of reflective aluminum or silver.

21. (new) The system of claim 10 where the dielectric layer is silicon dioxide or silicon monoxide.

22. (new) The system of claim 10 where the exposed dielectric layer surface is modified to have free amine groups.

23. (new) A system for analyzing a sample for the presence of specific targets in a biochip while eliminating major background emissions, which system comprises:

a biochip that includes

a flat optical mirror surface which reflects incident excitation and/or emission photons,

one or more transparent dielectric layers coating said mirror surface, and

a plurality of three-dimensional domains attached to a top flat surface of said dielectric layer, each domain yielding detectable photon energy corresponding to the presence of analyte distributed throughout the domain as a result of spontaneous emission, scattering or other mechanism, each domain being of a thickness equal to or greater than about one-half of an optical emission wavelength of said photon energy, and

an optical detection system that is adapted to quantify the presence of analyte in each domain by measuring or imaging photons associated with each analyte domain,

said dielectric layer or layers having a thickness which is approximately N/2 wavelengths, where N is any integer greater than 0 and a refractive index such that, for light energy having a range of reference wavelengths emitted via spontaneous emission, scattering or other process occurring at about the top surface of said dielectric layer, destructive interference occurs between wavefronts emitted or scattered toward the direction away from the mirror and wavefronts emitted or scattered toward the mirror surface and reflected by the mirror surface,

whereby such net destructive interference which occurs at the range of reference wavelengths diminishes any contaminant optical signal from sources of potential background photon contamination at said top flat surface.

24. (new) The system of claim 23 wherein said optical detection system includes a source of excitation or illumination which is located above said top surface and which is capable of inducing optical emission from such analyte.

25. (new) The system of claim 23 wherein said detection system includes means for imaging an identifiable pattern of source brightness distribution which can be used to estimate:

i. the three-dimensional morphology of the domains containing analyte, and
ii. the distribution of analyte within the three-dimensional structure of the domain.

26. (new) The system of claim 23 wherein said means for imaging includes means for integrating the brightness over the entire image of the domain to approximate the quantity of domain analyte.